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## **APPENDIX E: ECONOMIC IMPACT FORECAST SYSTEM (EIFS) MODEL**

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# **ECONOMIC IMPACT FORECAST SYSTEM (EIFS) MODEL**

## **SOCIOECONOMIC IMPACT ASSESSMENT**

Socioeconomic impacts are linked through cause-and-effect relationships. Military payrolls and local procurement contribute to the economic base for the region of influence (ROI). In this regard, the actions proposed for the Fort Belvoir Warrior in Transition Unit Complex would have a multiplier effect on the local and regional economy. With the proposed action, direct jobs would be created, generating new income and increasing personal spending. This spending generally creates secondary jobs, increases business volume, and increases revenues for schools and other social services.

## **THE ECONOMIC IMPACT FORECAST SYSTEM**

The U.S. Army, with the assistance of many academic and professional economists and regional scientists, developed the Economic Impact Forecast System (EIFS) to address the economic impacts of NEPA-requiring actions and to measure their significance. As a result of its designed applicability, and in the interest of uniformity, EIFS should be used in NEPA assessments for BRAC. The entire system is designed for the scrutiny of a populace affected by the actions being studied. The algorithms in the EIFS model are simple and easy to understand, but still have firm, defensible bases in regional economic theory.

EIFS is developed under a joint project of the U.S Army Corps of Engineers (USACE), the Army Environmental Policy Institute (AEPI), and the Computer and Information Science Department of Clark Atlanta University, Georgia. EIFS is an on-line system, and the EIFS Web application is hosted by the USACE, Mobile District. The system is available to anyone with an approved user-id and password. University staff and the staff of USACE, Mobile District are available to assist with the use of EIFS.

The databases in EIFS are national in scope and cover the approximately 3,700 counties, parishes, and independent cities that are recognized as reporting units by federal agencies. EIFS allows the user to define an economic ROI by identifying the counties, parishes, or cities to be analyzed. Once the ROI is defined, the system aggregates the data, calculates multipliers and other variables used in the various models in EIFS, and prompts the user for forecast input data.

## **THE EIFS MODEL**

The basis of the EIFS analytical capabilities is the calculation of multipliers that are used to estimate the impacts resulting from Army-related changes in local expenditures or employment. In calculating the multipliers, EIFS uses the economic base model approach, which relies on the ratio of total economic activity to basic economic activity. Basic, in this context, is defined as the production or employment engaged to supply goods and services outside the ROI or by federal activities (such as military installations and their employees). According to economic base theory, the ratio of total income to basic income is measurable (as the multiplier) and sufficiently stable so that future changes in economic activity can be forecast. This technique is especially appropriate for estimating aggregate impacts and makes the economic base model ideal for the EA and EIS process.

The multiplier is interpreted as the total impact on the economy of the region resulting from a unit change in its base sector; for example, a dollar increase in local expenditures due to an expansion of its military installation. EIFS estimates its multipliers using a location quotient approach based on the concentration of industries within the region relative to the industrial concentrations for the nation.

The user inputs into the model the data elements which describe the Army action: the change in expenditures, or dollar volume of the construction project(s); change in civilian or military employment;

average annual income of affected civilian or military employees; the percent of civilians expected to relocate due to the Army's action; and the percent of military living on-post. Once these are entered into the EIFS model, a projection of changes in the local economy is provided. These are projected changes in sales volume, income, employment, and population. These four indicator variables are used to measure and evaluate socioeconomic impacts. Sales volume is the direct and indirect change in local business activity and sales (total retail and wholesale trade sales, total selected service receipts, and value-added by manufacturing). Employment is the total change in local employment due to the Proposed Action, including not only the direct and secondary changes in local employment, but also those personnel who are initially affected by the military action. Income is the total change in local wages and salaries due to the Proposed Action, which includes the sum of the direct and indirect wages and salaries, plus the income of the civilian and military personnel affected by the Proposed Action. Population is the increase or decrease in the local population as a result of the Proposed Action.

### THE SIGNIFICANCE OF SOCIOECONOMIC IMPACTS

Once model projections are obtained, the Rational Threshold Value (RTV) profile allows the user to evaluate the significance of the impacts. This analytical tool reviews the historical trends for the defined region and develops measures of local historical fluctuations in sales volume, income, employment, and population. These evaluations identify the positive and negative changes within which a project can affect the local economy without creating a significant impact. The greatest historical changes define the boundaries that provide a basis for comparing an action's impact on the historical fluctuation in a particular area. Specifically, EIFS sets the boundaries by multiplying the maximum historical deviation of the following variables

**Table E-1: Historical Deviation Variables**

		<b>Increase</b>	<b>Decrease</b>
Sales Volume	X	100%	75%
Income	X	100%	67%
Employment	X	100%	67%
Population	X	100%	50%

These boundaries determine the amount of change that will affect an area. The percentage allowances are arbitrary, but sensible. The maximum positive historical fluctuation is allowed with expansion because economic growth is beneficial. While cases of damaging economic growth have been cited, and although the zero-growth concept is being accepted by many local planning groups, military base reductions and closures generally are more injurious to local economics than are expansion.

The major strengths of the RTV are its specificity to the region under analysis and its basis on actual historical data for the region. The EIFS impact model, in combination with the RTV, has proven successful in addressing perceived socioeconomic impacts. The EIFS model and the RTV technique for measuring the intensity of impacts have been reviewed by economic experts and have been deemed theoretically sound.

The following are the EIFS inputs and output data and the RTVs for the ROI. These data form the basis for the socioeconomic impact analysis presented in Section 3.10 of the EA.

### SUMMARY OF ASSUMPTIONS

For purposes of running the EIFS model, construction spending inputs were selected to determine the maximum impact that Proposed Actions could have on the regional economy. It was assumed that about

half of the civilian personnel would re-locate within the ROI. The construction costs and incoming personnel data were obtained through communication with Fort Belvoir personnel. The EA analysis assumes that 458 new personnel would relocate to the proposed Warrior in Transition Unit Complex. These personnel include new civilian and military employees, and military patients. It is further assumed that these include 87 new civilian employees and 371 new military staff and patients. The impacts from incoming personnel and construction spending are shown in Tables E-2 through E-4.

**Table E-2: Forecast Input for the EIFS Model**

<b>EIFS Report Fairfax and Prince William Counties, VA– Forecast Input</b>	
Change In Local Expenditures	\$70,000,000
Change In Civilian Employment	87
Average Income of Affected Civilian	\$62,000
Percent Expected to Relocate	50
Change In Military Employment	371
Average Income of Affected Military	\$35,000
Percent of Military Living On-base	74
Employment Multiplier	2.28
Income Multiplier	2.28

**Table E-3: EIFS Report for Fort Belvoir, VA – Forecast Output**

<b>Forecast Output</b>	<b>Value</b>	<b>Percent Change</b>
Employment Multiplier	2.28	
Income Multiplier	2.28	
Sales Volume – Direct	\$78,628,960	
Sales Volume – Induced	\$100,645,100	
Sales Volume – Total	\$179,274,000	0.22%
Income – Direct	\$ 34,159,730	
Income - Induced	\$ 22,689,330	
Income – Total (place of work)	\$ 56,849,060	0.12%
Employment – Direct	795	
Employment – Induced	432	
Employment – Total	1227	0.16%
Local Population	245	
Local Off-base Population	1032	0.08%

**Table E-4: EIFS Report for Fairfax and Prince William Counties, VA– RTV Summary**

<b>RTV Summary</b>				
	<b>Sales Volume</b>	<b>Income</b>	<b>Employment</b>	<b>Population</b>
<b>Positive RTV</b>	12.4%	11.85%	4.83 %	2.23%
<b>Negative RTV</b>	-11.56%	-5.23%	-6.37%	-0.9%

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